Abstracts

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Statin Use and Rupture of Abdominal Aortic Aneurysm

Wemmelund H, Høgh A, Hundborg HH, et al. Br J Surg 2014;101:966-75.

Conclusions: Statin use is associated with a reduced risk of rupture of abdominal aortic aneurysm (AAA) and lower case fatality following rupture of AAA.

Summary: There have been studies suggesting that statins may reduce AAA growth rates and rupture risk by enhancing endothelial function and attenuating oxidative stress and inflammation of the vessel wall (Liao JK. Am J Cardiol 2005;96: 24F-33F). Meta-analyses also suggests decreased growth rate of AAAs with the use of statins (Sweeting MJ et al, Br J Surg 2012;99:655-65). In addition there have been small, single-center observational studies suggesting an association between prehospital statin therapy and lower mortality following surgery for ruptured (rAAA) (Feeney JM et al, J Am Coll Surg 2009;209:41-6). In the current study the authors use the Danish National Registry of Patients, to examine incident rAAA cases and AAA control patients with a focus on the risk and prognosis of rAAA. This was a nationwide, population-based, combined case-control and follow-up study that included all patients (aged at least 50 years) with a first-time hospital admission for rAAA and 1:1 matched AAA controls without rupture in Denmark, from 1996 to 2008. Individual-level data on preadmission drug use, co-morbidities, socioeconomic markers, health care contacts and death were obtained from nationwide registries. The study included 3584 cases and 3584 match controls. Current statin use was registered for 418 patients with rAAA (11.7%) and 539 AAA controls (15.0%), corresponding to an age- and sex-matched odds ratio of 0.7 (95% confidence interval [CI], 0.60-0.81) for rAAA in current statin users vs never users. The decreased risk of rAAA remained after adjustment for potential confounding factors (adjusted odds ratio, 0.73; 95% CI, 0.61-0.86). Overall, 30-day mortality rate from time of hospital admission among patients with rAAA was 46.1% in current statin users compared with 59.3% in never users (adjusted mortality rate [MRR] 0.80; 95% CI, 0.68-0.95). Patients who had formerly used statins did not have reduced mortality (adjusted MRR, 0.98; 95% CI, 0.78-1.22).

Comment: The study suggests benefits for statins in patients with AAA both in lower rupture rates and improved survival of ruptures. However, it has a number of significant limitations in that there was no data on AAA diameter, a known predictor of rupture. It may also be possible that patients who use statins are more cooperative in adherence to medical recommendations and have greater contact with a health care system, and therefore they are perhaps more healthy overall. Such patients may have their aneurysms diagnosed at a smaller size prior to rupture where they can be repaired electively. Nevertheless, given that patients with AAA generally have manifestations of atherosclerosis and vascular disease other than AAA that benefit from statins, there seems to be no downside to placing patients with AAAs on a statin medication. Certainly additional analyses of possible mechanisms of benefit are needed, but for the moment the results of this study support current guidelines that recommend initiation of prophylactic statin treatment in asymptomatic patients with AAA (Chaikof EL et al, J Vasc Surg 2009;50(Suppl):S2-S49), and (Moll FL, Eur J Vasc Endovasc Surg 2011;41(Suppl 1):S1-S58).

Outcomes After Endovascular or Open Repair for Degenerative Descending Thoracic Aortic Aneurysm Using Linked Hospital Data

von Allmen RS, Anjum A, Powell JT. Br J Surg 2014;101:1244-51.

Conclusions: In England, mortality for treatment of degenerative descending thoracic aneurysm is similar with open repair and TEVAR. Patients treated with TEVAR however higher re-intervention rates and worse long-term survival.

Summary: Degenerative thoracic aortic aneurysms are now preferentially treated with TEVAR instead of open repair by many surgeons. Comparisons however between TEVAR and open repair of degenerative thoracic aortic aneurysms have generally been through the use of registries, and in the U.S. a large Medicare database. The Medicare study determined 30-day and 5-year survival for an elective and emergency repair of descending thoracic aortic aneurysms between 1998 and 2007. Although mortality was lower for TEVAR than open repair 6.1% vs 7.1%; this did not reach statistical significance. In addition, 5-year survival was worse after TEVAR (73% vs 81%). This study however was conducted when TEVAR was undergoing fairly rapid technological change and to date updated reports were not available (Goodney PP et al, Circulation 2011;124:2661-9). In this study the authors analyzed patients aged over 50 years without a history of aortic dissection, who underwent repair of a thoracic aortic aneurysm between 2006 and 2011, a more recent cohort than the Medicare study. Principle outcomes were 30-day operative mortality, long-term survival (5 years), and aortic-related reinterventions. TEVAR and open repair were compared using mortality linked individual patient data from hospital episodes statistics (England) with crude and multivariable models and adjusted for age and sex. There were 759 patients who underwent thoracic aortic aneurysm repair, mainly for intact aneurysms (n = 618; 81.4%). Median ages of TEVAR and open cohorts were 73 and 71 years respectively ($P < .001$). More men than women underwent TEVAR ($P = .004$). For intact aneurysms operative mortality rate was similar for TEVAR and open repair (6.5% vs 7.6%; odds ratio, 0.79; 95% CI, 0.41-1.49). 5-year survival rate however was significantly worse after TEVAR (54.2% vs 65.6%; adjusted hazard ratio [HR], 1.45; 95% CI, 1.08-1.94). After 5 years, aortic-related mortality was similar in the two groups, but cardiopulmonary mortality was higher after TEVAR. TEVAR was associated with more aortic-related re-interventions (23.1% vs 14.3%; adjusted HR, 1.70, 95% CI, 1.11-2.60). There were 141 procedures for ruptured thoracic aneurysm (97 TEVAR, 44 open) with TEVAR showing no significant advantage in terms of operative mortality.

Comment: It is certainly possible that selection bias and increased cardiopulmonary morbidity may contribute to the decreased long-term survival of patients treated with TEVAR vs open repair for thoracic aortic aneurysm. Anecdotally, many surgeons feel patients with thoracic aneurysms have increased comorbidities vs those with abdominal aortic aneurysms and therefore find TEVAR an attractive alternative to open repair reflected in the increasing numbers of thoracic aneurysms treated with endovascular techniques. However, we still don't know whether the technique is cost-effective and truly effective. Clearly TVAR can be costly, especially if one considers the increase expense of surveillance and aortic related reinterventions. The authors contend that based on the available data and lack of cost-effectiveness data a shift to elective endovascular treatment of descending thoracic aortic aneurysms is not justified.

A Randomized Trial Comparing Treatments for Varicose Veins

Brittenden J, Cotton SC, Elders A, et al. N Engl J Med 2014;371:1218-27.

Conclusions: In a comparison of ultrasound-guided foam sclerotherapy, endovenous laser ablation and surgical treatment for treatment of varicose veins, all treatments had similar clinical efficacy. Complications were less frequent after laser treatment and ablation rates lower after foam treatment.

Summary: Endovenous thermal ablation techniques and ultrasound guided foam sclerotherapy are widely employed alternatives to surgery for the treatment of varicose veins. Smaller randomized trials and meta-analyses have concluded these treatments can be effective in terms of short-term technical success in clinician reported outcomes. However, despite the fact clinical practice guidelines recommend use of patient reported quality of life to assess outcomes of procedures for varicose veins, quality of life has never been the primary outcome measure in any randomized trials involving treatment foam sclerotherapy. The authors therefore performed a comparison of laser, surgery and foam sclerotherapy (CLASS) trial to assess the relative efficacies of these treatments in patients with primary varicose veins. This was a randomized trial involving 798 participants with primary varicose veins at 11 centers in the United Kingdom. Outcomes of foam, laser and surgical treatments were compared at 6 months with disease-specific quality of life and generic quality of life questionnaires as measured on several scales. Secondary outcomes included complications and measures of clinical success. After adjustment for baseline scores and

other covariants the mean disease-specific quality of life score was slightly worse after treatment with foam than after surgery ($P = .006$) but was similar in the laser and surgery groups. There were no significant differences between the surgery group and the foam or laser group in measures of generic quality of life. The frequency of procedural complications was similar in the foam group (6%) and the surgery group (7%) but was lower in the laser group (1%) than in the surgery group ($P < .001$). The frequency of serious adverse events was approximately 3% and was similar among the groups. Measures of clinical success were also similar among the groups, but successful ablation of the main trunks of the saphenous vein was less common in the foam group than in the surgery group ($P < .001$).

Comment: The three groups had similar improvements in venous clinical severity score at 6 months, however ablation of the great saphenous vein at 6 weeks occurred significantly less often after foam treatment (complete ablation 55%; partial ablation with a patent segment and no reflux 23%) than after either surgery (compete ablation 84%; partial ablation 6%) or laser treatment (complete ablation 83%; partial ablation 8%). Long-term follow-up therefore will be required to determine the durability of these treatments and the frequency of patients seeking retreatment after each of these forms of therapy of primary varicose veins. See also Abstract 5, "Patient-Reported Outcomes 5-8 Years After Ultrasound-Guided Foam Sclerotherapy for Varicose Veins" in this issue of the *Journal*.

Retrograde Aortic Dissection After Thoracic Endovascular Aortic Repair

Canaud L, Ozdemir BA, Patterson BO, et al. Ann Surg 2014;260:389-95.

Conclusions: Retrograde type A aortic dissection (RTAD) after TEVAR is an uncommon complication, but with a high mortality rate. It occurs more frequently in patients treated for acute and chronic type B dissection, and when the endograft is significantly oversized.

Summary: Thoracic endovascular aortic repair (TEVAR) is utilized for treatment of a wide variety of thoracic aortic pathologies. A potential lethal complication of this procedure is RTAD. So far, data with respect to etiologic factors associated with RTAD are few and hampered by data quality and reporting parameters. The European Registry of Endovascular Aortic Repair Complications reported 63 cases of RTAD among 4750 TEVAR procedures (Eggebrecht H et al, Circulation 2009;120:276-81). While there's a general consensus that RTAD may be more common in patients with acute type B aortic dissection there has been no definitive proven association. In this study the authors sought to provide insight into the etiological and procedural factors associated with RTAD following TEVAR. Data were obtained from the MOTHER Registry (Patterson B et al, Circulation 2013;127:24-32). These data were supplemented by cases from a systematic review of literature and data from both sources aggregated to report the contemporary literature. Univariate analysis and binary logistic regression analysis of patient and technical factors was performed. In MOTHER, RTAD developed in 16 of the 1010 patients (1.6%). Binary logistic regression demonstrated that an indication of TEVAR for aortic dissection (acute, $P = .000212$; chronic, $P = .006$) and device oversizing (odds ratio, 1.14 per 1% increase in oversizing above 9%; $P < .0001$) were significantly more frequent in patients with RTAD. Data from the systematic review was pooled with the MOTHER data and demonstrated that RTAD occurred in 1.7% (168/9894). Most of RTAD occurred in the immediate postoperative period (58%). Mortality rate was high at 33.6%. Odds ratio for RTAD acute aortic dissection was 10.0 (95% confidence interval, 4.7-21.9) and 3.4 (95% confidence interval, 1.3-8.8) for chronic aortic dissection. Incidence of RTAD was not significantly different for endografts with a proximal bare metal stent (2.8%) or a nonbare stent (1.9%; $P = .1298$).

Comment: The majority of RTADs in this study occurred interoperatively (20.9%) or in the immediate postoperative period (50%). However, 29.1% suffered RTAD more than 30 days after the procedure. This combined with the association with aortic endograft oversizing suggests that the complication is likely related to a combination of natural progression of the disease and fragility of the dissected aorta. Further studies should focus on at what point after the occurrence of acute aortic dissection that the risk of RTAD approaches that of treatment of a chronic aortic dissection and what degree of aortic endograft oversizing is optimal to lower the risk of RTAD.

Patient-Reported Outcomes 5-8 Years After Ultrasound-Guided Foam Sclerotherapy for Varicose Veins

Darvall KA, Bate GR, Bradbury AW. Br J Surg 2014;101:1098-104.

Conclusions: Ultrasound-guided foam sclerotherapy has durable results as reported by patient-reported outcomes to at least 5 years. Only 15.3% of limbs treated underwent retreatment for reoccurrence during follow-up.

Summary: Treatment of varicose veins results in significant improvements in health-related quality of life (Baker DM et al, Eur J Vasc Endovasc Surg 1995;9:299-304, and Michaels J et al, Br J Surg 2006;93:175-81). In the UK the National Institute for Health and Care Excellence (NICE) varicose vein clinical guideline published in July 2013 recommends patients with symptomatic varicose veins, regardless of CEAP class, be referred for assessment with duplex ultrasound imaging and consideration of intervention, preferably by endovascular techniques (NICE guideline CG168, London; 2013). However, to date few long-term data have been published on venous interventions; with most existing reports continuing to focus on technical outcomes rather than patient-reported outcome measures. Ultrasound-guided foam sclerotherapy (UGFS) has been reported to be clinically effective with low rates of re-intervention in some studies but other studies have raised concern that UGFS may not be as durable as surgery or endothermal techniques. In this study the authors sought to investigate long-term (5-8 years) outcomes following UGFS focusing on retreatment and disease specific and generic health-related quality of life parameters, symptom improvement, and meetings of patient expectations and overall patient satisfaction. The study utilized consecutive patients undergoing UGFS between April 2004 and May 2007. Patients were invited for review at least 5 years after treatment. Patients completed generic (Short Form 12) and disease-specific (Aberdeen Varicose Vein Symptom Severity Score, AVSS) health-related quality of life questionnaires and questionnaires inquiring about lower extremity symptoms, lifestyle factors, and satisfaction with treatment. Data on retreatment was recorded prospectively. There were a total of 391 limbs and 285 patients included (81.2% response rate) and a median of 71 (interquartile range, 67-78) months following first UGFS treatment. Originally 72.1% had symptomatic uncomplicated varicose veins while 21.9% had undergone previous surgery, and 82.7% had treatment of great saphenous veins and 19.9% had treatment of the short saphenous veins. Disease-specific health-related quality of life scores improved significantly at long-term follow-up, with 88.5% having an improved AVSS compared with baseline. With respect to lower limb symptoms and lifestyle improvement 62.7-93.8 per cent of patients had their pretreatment expectations met or exceeded. 82% overall were very satisfied with their treatments and only 3.3% were dissatisfied. 91% would recommend the treatment to others. Kaplan-Meier analysis indicated 15.3% of limbs required retreatment by 5 years.

Comment: In a recent systematic review the authors concluded that endovenous laser treatment radio frequency ablation and UGFS and surgery provided similar clinical outcomes in terms of reoccurrence, venous clinical severity scores, short-term pain and quality of life (Carroll C et al, Health Technol Assess 2013; 17 i-xvi, 1-141). The authors of the study point out that this finding compared with general lower overall costs of UGFS compared to endovenous thermal techniques and surgery suggest that UGFS may be the most cost-effective option for treatment of varicose veins. See also Abstract 3, "A Randomized Trial Comparing Treatments for Varicose Veins" in this issue of the *Journal*.

Activities of Daily Living Is a Critical Factor in Predicting Outcome After Carotid Endarterectomy in Asymptomatic Patients

Dayama A, Pimple P, Badrinathan B, et al. Stroke 2014;45:1703-8.

Conclusions: A patient's inability to perform basic activities of independent living is associated with adverse postoperative outcomes after carotid endarterectomy (CEA) for asymptomatic lesions.

Summary: The randomized trials of carotid endarterectomy both in North America and Europe assessing the efficacies of CEA for asymptomatic disease generally excluded patients with a number of comorbid medical conditions such as congestive heart failure, unstable angina, uncontrolled atrial fibrillation, or uncontrolled diabetes, etc. However, specific measures of functional status were not utilized in patient stratification in these trials. The authors point out therefore that conventional models of stroke prevention after CEA in asymptomatic patients have not been developed to accurately predict outcomes in patients who are unable to perform activities of daily living (Bekelis K et al, Stroke 2013;44: 1085-90). In this current study the authors sought to assess the effect of preoperative functional status on postoperative outcomes following CEA in asymptomatic patients. The hypothesis was that preoperative functional disability would be associated with worsened postoperative outcomes and in turn impaired survival of the patients. Aided from the National Surgical Quality Improvement Project, a national data set including data from more than 300 hospitals was utilized in this study. Patients were identified by Current Procedural Terminology (CPT) codes and divided into three categories based on functional status; independent, partially dependent and dependent. Thirty-day postoperative stroke, death and other postoperative complications were identified as the study endpoint. Multivariate logistic regression analysis